Design and production of Pumps and Eqiupement



Using the best CAD/CAM/CAE solution for engineering design, validation and manufacturing of products

- Hydraulic and mechanical design of pumps and equipment
- Generating technical and after sales documentation
- Simulation an Validation of products
- Manufacturing of model, prototype pumps and other parts or serial production
- Controlling and Inspection
- After sale services



Product Data Management (PDM) products manage and synchronize our design data across our entire enterprise

All data are securely stored and indexed in one database – Vault:

- Design data
- Sketches and documentation
- Manufacturing data, NC programs ...
- Supplier data
- Materials
- Cost calculations, etc

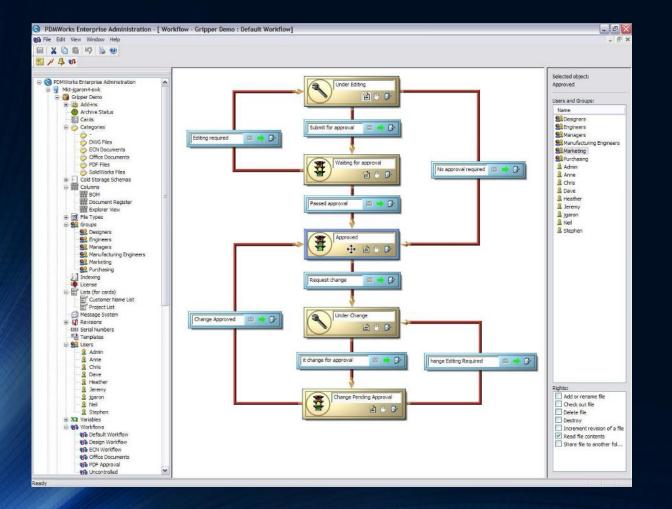




Everyone involved in the process share information and collaborate on designs - inside and outside the organization in multiple locations



Product Data Management (PDM) products manage and synchronize yur design data across our entire enterprise

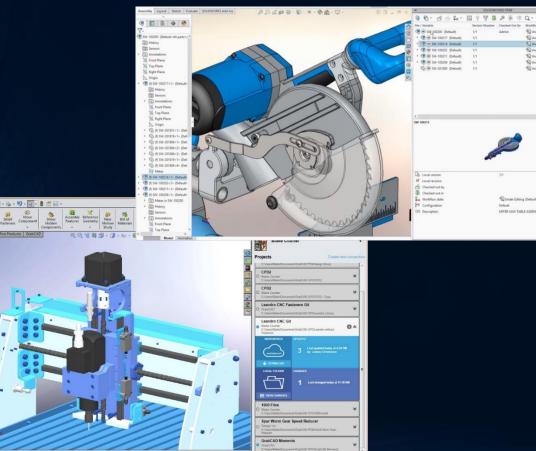


Creating an electronic workflow to formalize, manage, and optimize development, document approval and engineering change processes



Product Data Management (PDM) products manage and synchronize yur design data across our entire enterprise

Revision Control



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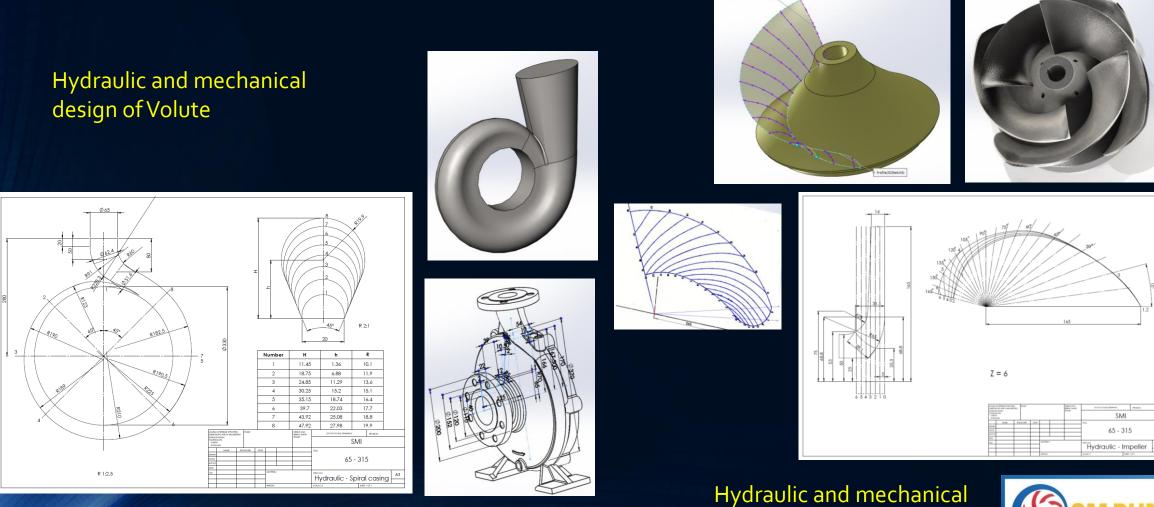
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Search and integrated preview In user friendly environment – Windows explorer



Hydraulic and mechanical design of pumps and equipment

Guide Curve(3DSketch4)

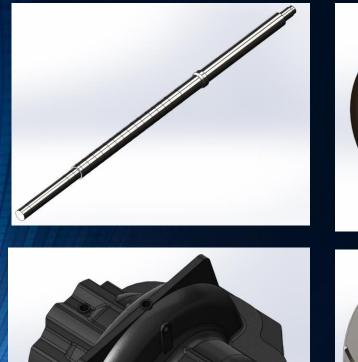


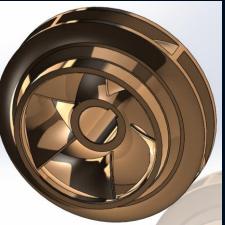
design of Impeller

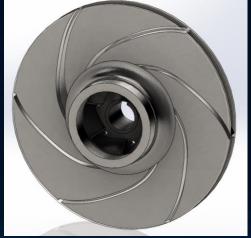


Hydraulic and mechanical design of pumps and equipment

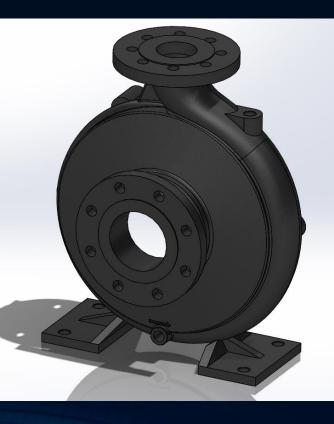
• Mechanical design of other components

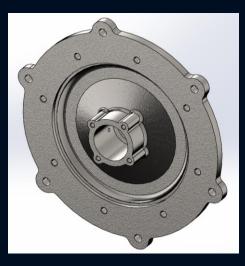
















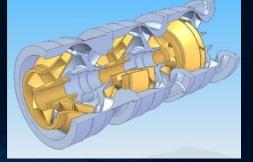
Hydraulic and mechanical design of pumps and equipment

• Creating and checking functionality (motion study) of assemblies and subassemblies







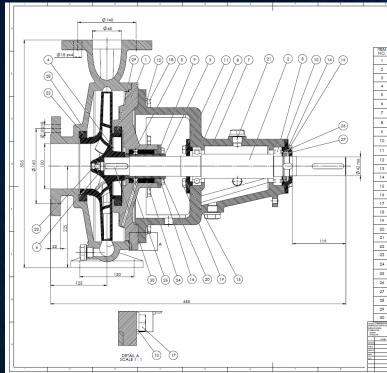




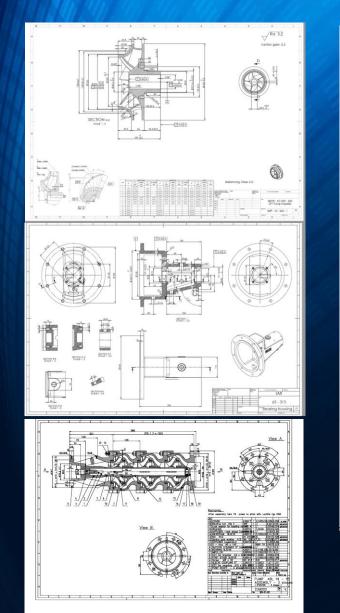


Generating technical documentation and specifications

- Assembly drawings
- Work shop drawings
- Drawings for control and inspection
- Technical specifications
- Templates



		ITEM NO.	PART NUMBER	DESCRIPTION	WEIGHT (kg)	on.
		1	Cover		22.6	1
		2	Shaft		6.6	1
		3	Shaft sleeve		0.52	1
		4	Impeller		9.8	1
		5	Water ring		0.1	1
		6	Impeller Nut		0.15	- 1
		7	Bearing housing		20.7	- 1
		8	Radial Ball Bearing_62_SKF			2
		9	Gland		0.4	1
		10	Bearing cover 2		0.7	1
		11	Bearing cover 1		0.6	1
2		12	Nut	ISO 7089 008CHFI3		8
0 42 m6		13	Bolt	ISO 7089 008FR1W3		6
6		14	Nut	ISO 7089 008HYWG3		4
,		15	Nut	ISO 7089 008J6PP3		4
		16	Nut	ISO 7089 008PJFN3		4
		17	Bolt	ISO 4015 008XITK3		6
		18	Bolt	ISO 4018 0092C1O3		8
		19	Bolt	ISO 4018 0094G4U3		8
		20	Bolt	ISO 4018 009A8873		4
		21	Plug		0.12	5
		22	Nut	ISO 4762 00GXCZR3		1
		23	Wearring 1		1.1	- 1 '
		24	Soft packing ring	Ø54xØ74x34		- 1
		25	Soft packing ring	Ø54xØ74x10		1
		26	Safety ring			1
		27	KM nut	M45x1,5		- 1
		28	Spiral casing		40.3	1 0
		29	Wearring 2		1.2	1
		30	Key Form A ISO R773	12x6x52		1
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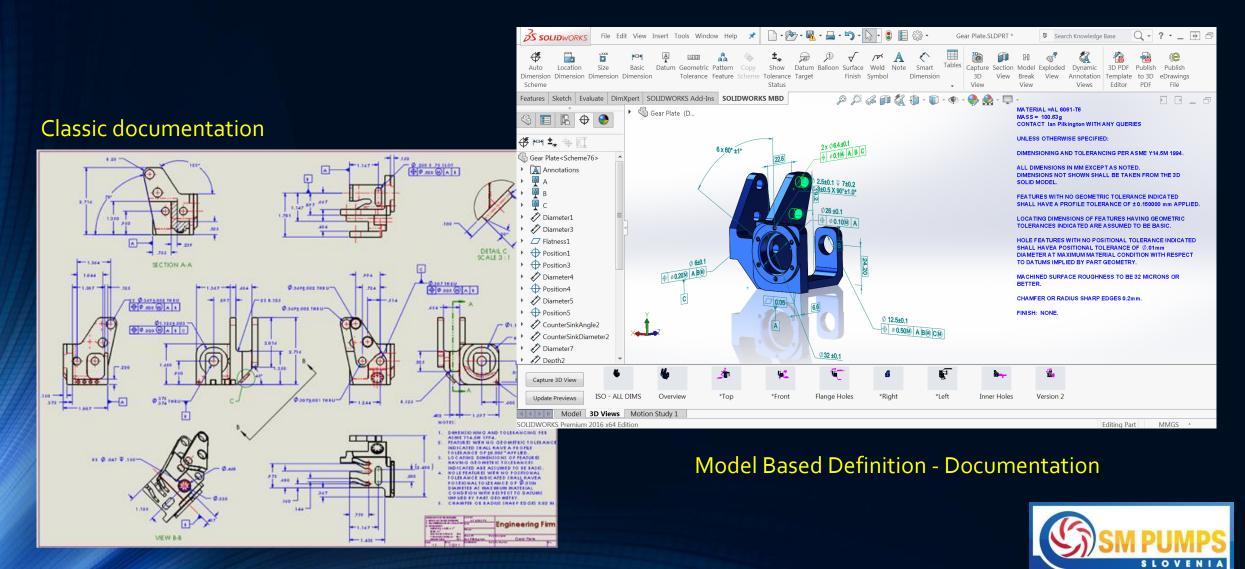


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6	Impeller Nut		0.15	1
7	Bearing housing		20.7	1
8	Radial Ball Bearing_62_SKF			2
9	Gland		0.4	1
10	Bearing cover 2		0.7	1
11	Bearing cover 1		0.6	1
12	Nut	ISO 7089 008CHFI3		8
13	Bolt	ISO 7089 008FR1W3		6
14	Nut	ISO 7089 008HYWG3		4
15	Nut	ISO 7089 008J6PP3		4
16	Nut	ISO 7089 008PJFN3		4
17	Bolt	ISO 4015 008XITK3		6
18	Bolt	ISO 4018 0092C1O3		8
19	Bolt	ISO 4018 0094G4U3		8
20	Bolt	ISO 4018 009A8B73		4
21	Plug		0.12	5
22	Nut	ISO 4762 00GXCZR3		1
23	Wear ring 1		1.1	1
24	Soft packing ring	⊘54x⊘74x34		1
25	Soft packing ring	⊘54x⊘74x10		-1
26	Safety ring			-1
27	KM nut	M45x1,5		1
28	Spiral casing		40.3	-1
29	Wear ring 2		1.2	1
30	Key Form A ISO R773	12x6x52		1



Generating technical documentation and specifications

Integrated drawingless manufacturing solution



Generating after sales and marketing documentation

- Spare parts
- Manuals
- Technical specifications
- High quality images, etc...





Simulation and Validation

In design process – during the designer are looking for the best solution

- Structural analysis with static and dynamic load

von Mises (N/m^2)

2.7e+008

2.5e+008

2.2e+008

2.0e+008

1.8e+008

1.6e+008

1.3e+008

1.1e+008

9.0e+007

6.8e+007 4.5e+007

2.3e+007

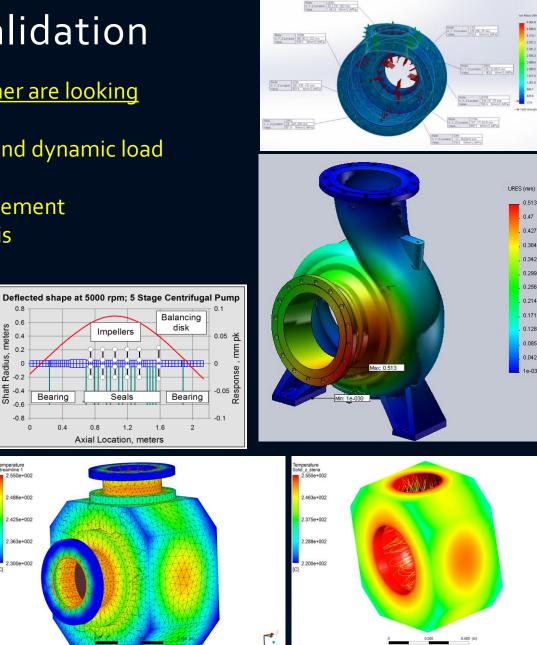
3.8e+004

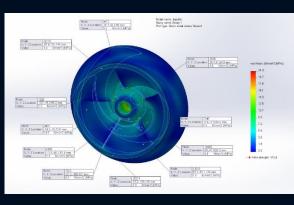
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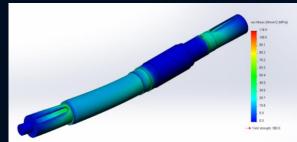
- Thermal analysis
- Deformation with large displacement
- Structural Optimization analysis

Min: 3.8e+004

Max: 2.7e+008







0.513 0.47

0.427 0.384 0.342 0.299 0.256

0.214

0.171

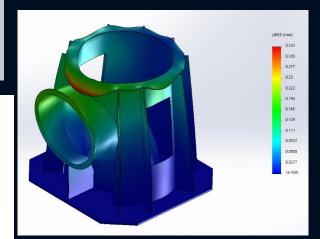
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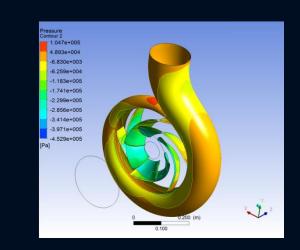


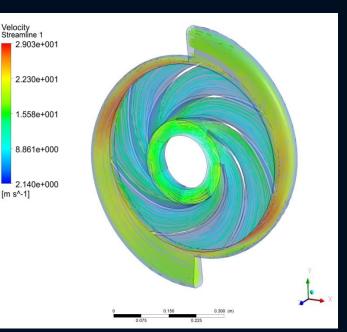


Simulation and Validation

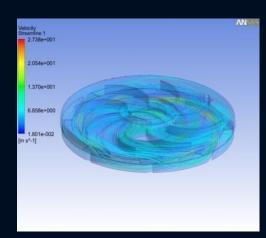
External Validation

- **CFD** Analysis Flow Simulation
- Fluid flow
- Heat transfer
- **Displacement distribution from** a coupled thermal-stress

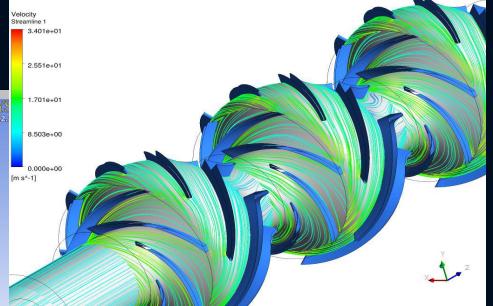


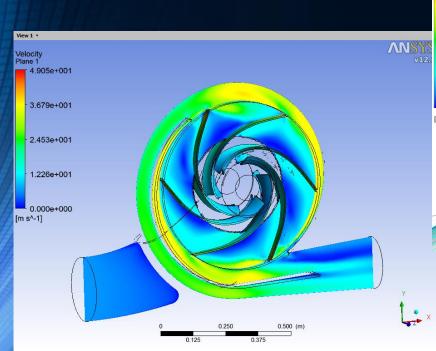


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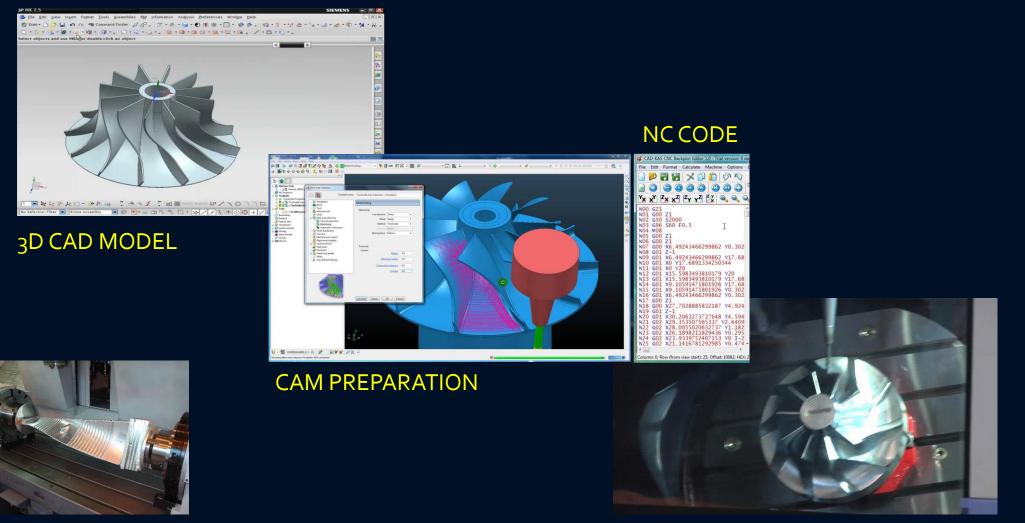






SAMPLE:

- Manufacturing of Impeller for prototype pump (with 5 axis machine) using special CAM strategies



MANUFACTURING



SAMPLE:

- Manufacturing of Impeller for prototype pump (with 3 axis machine)







Manufacturing of difusor





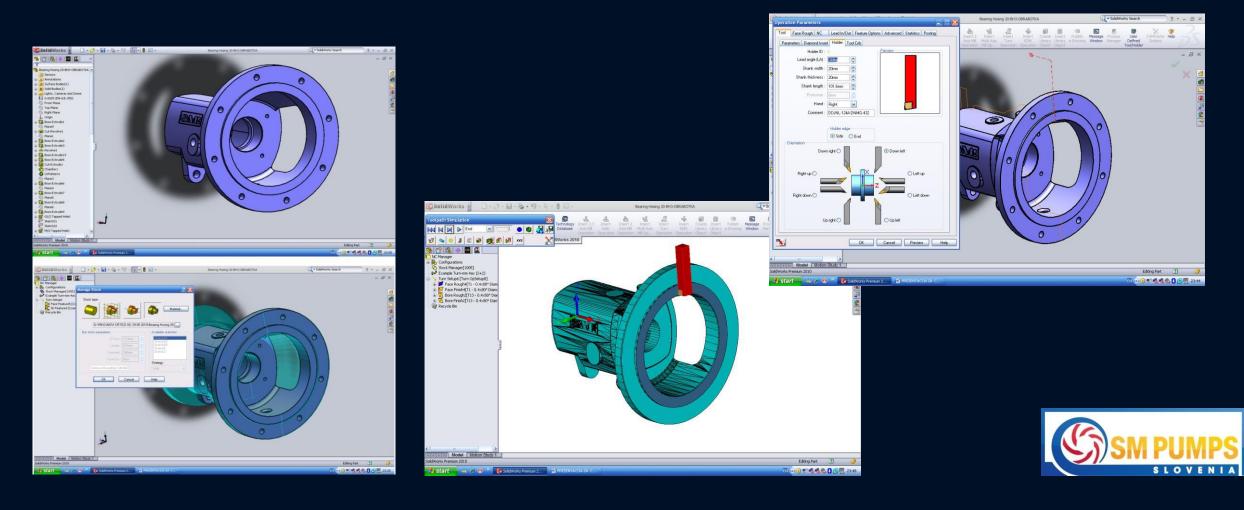


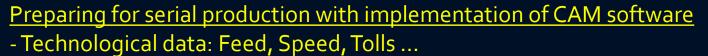




Preparing for serial production with implementation of CAM software

- Some 3D models of parts are used as a input in CAM software
- Any change in the drawings is automatically changed in the CNC program for machining





- NC code for: Milling – 2 to 5 axis, Turning, Turn-Mill machines

Company	KG		CNC Mach	Example Turn-mm 4a
Date/Time	06/07/10 23:	31	Setup#	1 of 1
Material	1005		Programmer	
Setup Name	Turn OpSetu		Units	MM
Part File	Bearing Hos	ng 20-BH	Mach Time(min)	10,15
Tool St.	1			
Operation	Face Roug	h4		
Insert	CNMG-43	1		1 - 1
Holder	DDJNL-12	4A-DNMG-432		
Speed	106	RPM		
Feed	24,397	FPM		
Time(min)	5,66			
Tlp Len	1.017,86			
Tool St.	1			
Operation	Face Finis	M		
Insert	CNMG-43			2
Holder		4A-DNMG-432		-
Speed	106	RPM	14	
Feed	0.229	FPR		
Time(min)	2,79	11.0		
Tip Len	796,17			
Lib Coll	1.50,17			
Tool St.	13			
Operation	Bore Roug	h2		*
Insert	CNMG-431			1
Holder	DDJNL-12	4A-DNMG-432	1.0	
Speed	442	RPM		
Feed	101,158	FPM		
Time(min)	1,12			
Tip Len	1.329,15			

	My Co	ompany Name	9
	SET	TUP SHEET	
Material 100 Stock Size 340	,00, 340,00, 320,0 ,00, ,00	Part File CNC Mach Setup# Programmer Units Mach Time{mi	Bearing Hosing 20-E Example Mill-mm 1 of 2 MM 1,06
Tool# Operation Tool Description Holder Number Speed Feed Mach Depth Min. Tool Prot. Len. Tip Len Time	42 Tap1 10.0X1.5 TAP Add Comment Default 213,445977279403 320,168815919104 14,90 N.A. 577,62 0,71	•	
Minimum X: -45,96194078 Y: -45,96194078 Z: -14,9			

	Tool Name: endmill/ Show all holders Only show holders that a spindle	1200:4reg match the current		
	Current Spindle CAT 50,	Spindle		
-	Tool Holders:	2 🔻 🜁		
-	Name	Type Tool dia	Spindle	
	CAT 30, EndMi	Endmill dynamic	CAT 30. Spindle	
	CAT 30, Collet	Collet dynamic	CAT 30, Spindle	
	CAT 40, EndMil	Endmill dynamic		
	CAT 40, Collet	Collet dynamic		
	CAT 50, EndMil	Endmill dynamic	CAT 50, Spindle	
	CAT 50, Collet	Collet dynamic	CAT 50, Spindle	E
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	Setup:	Setup1 (1 of 1)					
	Date:	Tuesday, March 17, 2	015 09:42:28				
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	Slot 2:	center_M1250-0500	D 5.000 mm	L 5.000 mm			
	Slot 3:	TD_M0600:J	D 6.000 mm	L 70.000 mm			
		endmillM0800:reg	D 8.000 mm	L 40.000 mm	F2	T 0.000	
		endmillM2000:reg	D 20.000 mm	L 38.100 mm		T 0.000	
		endmillM1200:4reg	D 12.000 mm	L 31.750 mm		T 0.000	
		endmillM1400:reg-gro				F2	T 2.000 mm
		endmillBM1200:4reg		L 25.000 mm	F4	T 6.000	
	Slot 9:	endmillM1200:reg	D 12.000 mm	L 25.400 mm	F2	T 0.000	
		endmillM0600:reg	D 6.000 mm	L 35.000 mm	F2 F4	T 0.000	
	Slot 11:	endmillM0600:4reg	D 6.000 mm	L 15.880 mm	F 4	T 0.000	mm

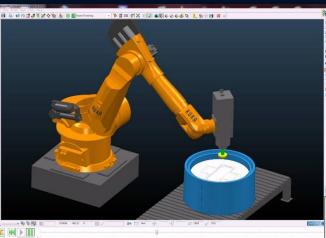
R	NC Code
S	(FINISH FACE1)
	N25 C0 G40 C49 G80 G90
	N30 T1 M6
	N35 G54 X326.47 Y5.556
	N40 M03 S10000
	N45 G43 H1 Z26.0 M8
	N50 Z4.0
	N55 G1 Z0. F5000.0
	N60 X-21.0
	N65 Y32.112
	N70 X326.47
	N75 Y58.668
	N80 X-21.0
	N85 Y85.223
	N90 X326.47
	N95 Y111.779
	N100 X-21.0
l	N105 Y138.335
	N110 X326.47
	N115 Y164.891
	N120 X-21.0
	N125 Y191.447
	N130 X326.47 N135 Y218.003
	N135 1210.005 N140 X-21.0
	N145 Y244.558
	N150 X326.47
	N155 Y271.114
	N160 X-21.0
	N165 Y297.67
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	N175 G0 Z26.0
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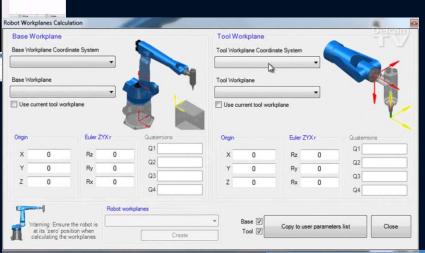
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Page 1 of 2

Specific industry machining solution -Robot programming





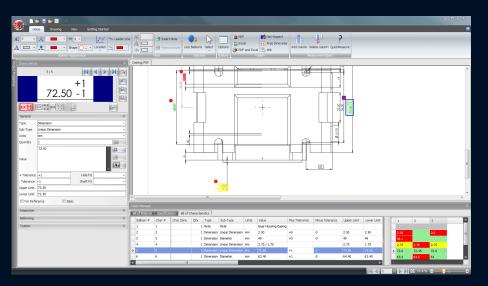




Controling and inspection

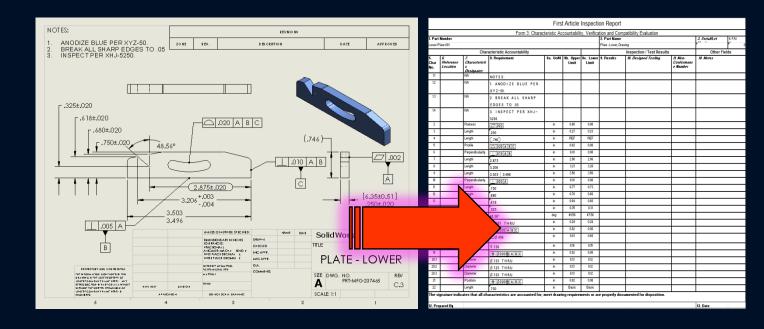


- Automatically Excel table creation (Measuring List) from 2D Drawings in CAD, PDF or JPG format
- Save time and eliminate possibility of mistakes



System recognize:

- Dimension
- Tolerances
- Geometrical tolerances
- Notes



Product Data Management System

BASIC RULE – EVERUBODY MUST USE SAME DATABASE

- The Data are Securely stored and indexed and concerns about version control and data loss are eliminated

- Sharing and collaborating designs with people inside and outside the organization in multiple locations.

Create an electronic workflow to formalize, manage, and optimize development, document approval, and engineering change processes.

Secure Access

- **Revision Control**
- Find and Reuse Design Data
- Audit Trail
- Integrated Search
- Advanced Search and Favorites Remote Access
- Integrated eDrawings Preview
- Multi-Document Preview
- Scalability

- Automated Neutral File Creation
- **Custom Configuration**
- Automated Data Import and Export
- Serial Number Generators
- Distributed Design Teams
- Automated Approval Process
 - **Email Notifications**



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Rapid Prototyping and Reverse Engineering







Reverse Engineering - From physical to CAD model

